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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/993,894 | 11/23/2001 | Bahram Javidi | UCT-003 | 7643 |
| 23413 | 7590 | 08/18/2005 | EXAMINER | |
| CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 | | | DINH, MINH | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2132 | |

DATE MAILED: 08/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 09/993,894 | Applicant(s) JAVIDI ET AL. | |
| | Examiner Minh Dinh | Art Unit 2132 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/23/2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/8/02, 11/28/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

1. Claims 1-35 have been examined.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-25 and 29-35 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted step is: sampling the encrypted data to avoid the overlap between adjacent data at the receiving end. The omitted step is disclosed to be essential to the invention as described in the specification (p. 3, last paragraph; p. 4, 2nd paragraph; p. 12, 1st paragraph).

4. Claims 26-28 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: means for sampling the encrypted data to avoid the overlap between adjacent data at the receiving end. The omitted element is disclosed to be essential to the invention as described in the specification (p. 3, last paragraph; p. 4, 2nd paragraph; p. 12, 1st paragraph).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Javidi et al (5,903,648) in view of Sun et al ("All-Optical Parallel-to-Serial Conversion by Holographic Spatial-to-Temporal Frequency Encoding").

Regarding claim 1, which is exemplary of claims 17, 26, 29 and 31, Javidi discloses a method for encrypting optical images. Javidi further discloses that an image is optically encrypted, and that the resulting encrypted data is stored and read out in the spatial domain (Abstract; col. 3, lines 16-60; fig. 7). Javidi also discloses transmitting the encrypted data in the spatial domain, receiving and decrypting the encrypted data to recover the image (fig. 16). Javidi disclose transmitting the data in the spatial domain. Javidi does not disclose converting the data from the spatial domain to the temporal domain prior to transmission and converting the converted data to the spatial domain at reception. Sun discloses an optical communication method in which data is converted from the spatial domain to the temporal domain prior to transmission, transmitted and converted from the temporal domain to the spatial domain at reception (p. 1728, left col., 1st - 2nd paragraphs; figures 1 and 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the Sun

method of communication into the Javidi method of transmitting encrypted data such that the data is converted from the spatial domain to the temporal domain prior to transmission, transmitted and converted from the temporal domain to the spatial domain at reception. The motivation for doing so would have been that parallel optical signals could be transmitted over long-distance optical fiber networks.

Regarding claims 2, 18 and 32, Sun further discloses conversion of ultrashort light pulses which meet the limitation of ultrafast laser pulses (p. 1728, left col., 1st - 2nd paragraphs).

Regarding claims 3, 19 and 33, Sun further discloses conversion of ultrashort pulses spread in the spatial domain according to their spectral components (p. 1730, left col., 2nd paragraph).

Regarding claim 4, Sun further discloses that the ultrashort pulses are spread in the spatial domain using diffraction (fig. 1; p. 1730, left col., 2nd paragraph).

Regarding claim 5, Sun further discloses an optical network for transmitting the converted data (p. 1728, left col., 1st paragraph).

Regarding claim 6, Sun further discloses that converting the data received to the spatial domain is implemented using ultrashort light pulses which meet the limitation of ultrafast laser pulses (p. 1728, left col., 1st - 2nd paragraphs).

Regarding claims 7-8, 20-21 and 28, Javidi further discloses that the optical encryption includes double random phase encryption (Abstract).

Regarding claims 9 and 22, Javidi further discloses that the double random phase encryption includes phase encryption in the spatial domain and phase encryption in the frequency domain (col. 3, lines 16-38).

Regarding claims 10 and 23, Javidi further discloses storing of encrypted data comprises holographically storing said encrypted data (fig. 3).

Regarding claims 11, 13, 24 and 34, Sun further discloses forming a real-time hologram using read-out data and a reference beam, reading out the real-time hologram, and converting the read-out hologram from the spatial domain to the temporal domain (fig. 1a).

Regarding claims 12, 14, 25 and 35, Sun further discloses that reading out the real-time hologram comprises directing a diffracted ultrashort pulse at the real time hologram (fig. 1a).

Regarding claims 15-16, Javidi further discloses that decryption includes phase decoding in the spatial domain and in the frequency domain (col. 3, lines 39-60).

Regarding claims 27 and 30, Sun further discloses that diffracted ultrashort light pulses are converted to the spatial domain at the receiver node (fig. 1b).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,793,871 to Jackson

U.S. Patent No. 6,577,782 to Leaird et al.

Ding et al, "Femtosecond Pulse Shaping by Dynamic Holograms in Photorefractive Multiple Quantum Wells"

Leaird et al, "Chirp Control in the Direct Space-to-Time Pulse Shaper"

Leaird et al, "Femtosecond Optical Packet Generation by a Direct Space-to-Time Pulse Shaper"

Matoba et al, "Encrypted Optical Storage with Angular Multiplexing"

Matoba et al, "Encrypted Optical Storage with Wavelength-Key And Random Phase Codes"

Sun et al, "Space-Time Processing with Photorefractive Volume Holography"

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh Dinh whose telephone number is 571-272-3802. The examiner can normally be reached on Mon-Fri: 10:00am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gilberto Barron can be reached on 571-272-3799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2132

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MD

Minh Dinh
Examiner
Art Unit 2132

8/3/05



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SUPERVISORY PATENT EXAMINER
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